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A POPULAR TREATISE ON THE COMMON INDIAN
SNAKES.

ILLUSTRATED BY COLOURED PLATES AND DIAGRAMS.

BY

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Part VI., with Plate VI., Diagram and Map.

(Continued from page 17 of this Volume.)

THE GOLDEN TREE-SNAKE (*Chrysopelea ornata*).

Nomenclature.—Scientific.—The generic name is from the Greek *chrysos* gold, and *peleios* black. The specific is from the Latin *ornatus* adorned.

English.—The golden tree-snake or the gold and black tree-snake.

Vernacular.—“Kalla Jin” the name given by Russell for a specimen probably obtained in Bengal, is probably Urdu implying “black saddles” with reference to the black cross bars. Its name in Ceylon according to Ferguson is “pol mal karawala.”

Dimensions.—The largest specimen I know of is the one obtained by Evans and me in Rangoon, which taped 4 feet 5½ inches. Specimens over 4 feet are unusual.

Physiognomy and bodily configuration.—The snout is broad, blunt, and rounded, the head flattened and the neck moderately constricted. A moderately well developed eye with golden iris (Cantor says black)

gives a vivacious expression to a not unpleasing countenance. The pupil is round. The nostril is moderate in size, and placed entirely or almost entirely in the anterior nasal shield. The body though rather slender is far less so than in other tree snakes, notably *Dendrophis*, *Dendrelaphis* and *Dryophis*. It is rather depressed. The belly is peculiar in the ridges on the lateral aspect of the ventral shields. The tail is long, and tapers very gradually. It is about one-fourth the total body length and it is ridged beneath on either side similarly to the belly.

Colour.—Mr. Boulenger* divides this species into eight colour varieties, many of which I have not seen. I quote therefore from him, supplementing the habitats he records, from my notes, and other sources. Many of the references of other authors, however, to this snake make it impossible to refer the specimen to any of these varieties, for want of precise information regarding the colour.

“A.—Black above, each scale with a round greenish-yellow spot; usually with larger coral-red spots on the back, resembling a series of tetrapetalous flowers; ventrals greenish-yellow, edged with black.”

South India (Anamallays), Malay Peninsula, Malay Archipelago (Sumatra, Borneo).

Stoliczka† mentions this as common at Penang, and Flower‡ alludes to it from Penang and Singapore. Annandale§ records it from Narcondam Island.

“B.—Like the preceding, but ventrals not black edged.”

S. India (Malabar), Malay Archipelago (Java, Sooloos, Philippines).

I examined one in the Siccawei Museum, Shanghai, from the Yangtse Valley, S. China.

“C.—Like the preceding, but vertebral spots confluent into a stripe, at least on the anterior part of the body.”

Borneo.

“D.—Greenish-yellow or pale green above, each scale edged, and mesially streaked with black, with more or less distinct black cross-bars; ventrals yellow, with a small black spot on each side.”

S. India (Anamallays), Burma, Assam, Siam, Lao Mountains.

* Catalogue, Brit. Mus., Vol. III, 1896, p. 197.

† Journl. Asiat. Soc. Bengal, Vol. XXXIX, p. 194.

‡ Proc. Zool. Soc. Lond., 1899, p. 682.

§ Journl. As. Soc. Bengal, 1905, p. 176.



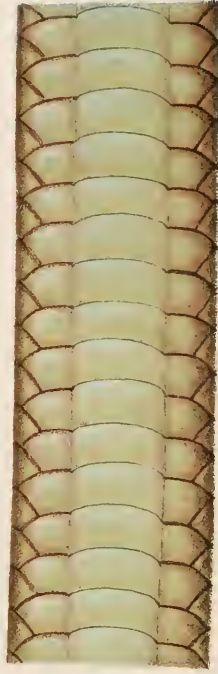
1.



2.



3.



4.



5.



6.

J. G. del.

J. Green Chromo lith.

THE GOLDEN TREE-SNAKE.
Chrysopelea ornata. (harmless)

Flower mentions it as fairly abundant in Siam and records it as far south as Kedah in the Malay Peninsula, where he says it is replaced by variety *A*.

“*E*.—Like the preceding, but with a series of large coral-red, or orange blotches along the back.”

Ceylon, Bengal.

The plate in Russell’s work is evidently this colour variety. Evans and I met with this in Burma, but it is decidedly scarcer than type *D*, which is the common one in that Province. The orange spots are not nearly so brilliant as I have seen in Ceylon specimens.

Figures 1, 2, 3 and 4 are taken from a good example from Kulhatty. (Nilgiri Hill).*

“*F*.—Pale olive above, with regular black cross-bars ; some of the black scales with yellow shafts ; whitish olive beneath, with a small black spot on the side of each ventral.”

Ceylon.

“*G*.—Black above, with narrow yellowish cross-bars ; whitish olive beneath, with a small black spot on each side of each ventral.”

Philippines.

“*H*.—Olive above, with the markings much effaced ; pale yellowish beneath.”

Celebes, Philippines.

To these I would add another—

I.—Similar to variety *E*, but differing in the vertebral spots being yellow instead of red, and in the absence of cross-bars.

This variety is figured in our plate figs. 5 and 6. The specimen was captured at Barisal in the Gangetic Delta, and is in our Society’s collection in Bombay.

Identification.—This is an easy matter if attention be directed to scale characters.

The ridged (keeled) condition of the ventral shields taken with a vertebral row of scales. in no way different from its adjacent rows, establishes the diagnosis. The ridged character of the ventral shields demands some qualifying remarks. It must be impressed upon the student that the keels in *Chrysopelea* are *sharp and pronounced*,

* Figure 4 is represented unduly broad in order to show the whole breadth of the ventrals with their keels ; these latter however are not made conspicuous enough. The outline drawing shows them better.

with a minute notch on the free edge of the ventral corresponding to the keel.

This character of keel is only seen in two other genera, viz., *Dendrophis* and *Dendrelaphis*, both of which are tree snakes also. In both these genera however the vertebral row of scales is enlarged, and hexagonal as in the kraits (*Bungarus*). It is to be noted that several other snakes have what may be called false keels on their ventrals, that is, the ventrals are laterally angulated. False keels are rather rounded (obtuse), and have no notch at the free edge of the ventral. The outlines in section may be compared roughly to those of a punt, and a dinghy (see Diagram I, fig. 1, A and B).

It is interesting to note that these false keels are to be seen chiefly in those snakes which manifest a climbing habit. For instance, in the genus *Lycodon*, witness the species *aulicus*. In the genus *Zamenis*, observe the ventrals in *mucosus*. In the genus *Coluber* are notably the arboreal species *prasinus*, *frenatus*, and *oxycephalus*.

In some other snakes however not conspicuous climbers the same may be seen, as for instance, many of the genus *Simotes*. In addition obtuse ventral keels are to be seen in the water snake *Hipistes hydrinus*. In McMahon's viper (*Eristocophis memahoni*) the ventrals are rather acutely keeled, but there is no enlargement of the vertebral row.

The only snake I know at all like *Chrysopelea* is Jerdon's pit viper (*Lachesis jerdonii*). In this the colouration is very similar, but any resemblance between these two snakes ends here. They are substantially different in almost every scale character. We do not give a plate of Jerdon's viper owing to its rarity, and restricted Indian distribution, viz: Khasya Hills (Assam.)

Haunts.—Very opposite opinions prevail as to its haunts. Cantor says it is seldom seen in trees, but more frequently on the ground in the grass. Stoliczka supports this observation, and says though he caught several specimens in the grass, or between low bushes, he but once saw one actually on a bush. Flower on the other hand says his experiences are very different in this as in other matters from those related by Cantor, and he agrees with Günther's suggestion that the reason it is not more often seen in trees is because it makes a too rapid retreat.

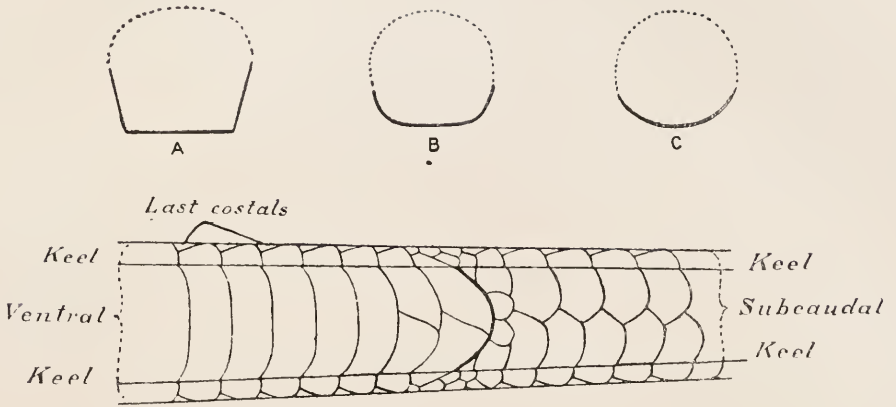


Fig.1

A. Pent like ventrals of *Chrysopelea*

B. Boat like ventrals of *Lycodon aulicus*

C. Rounded ventrals of *Cobra*

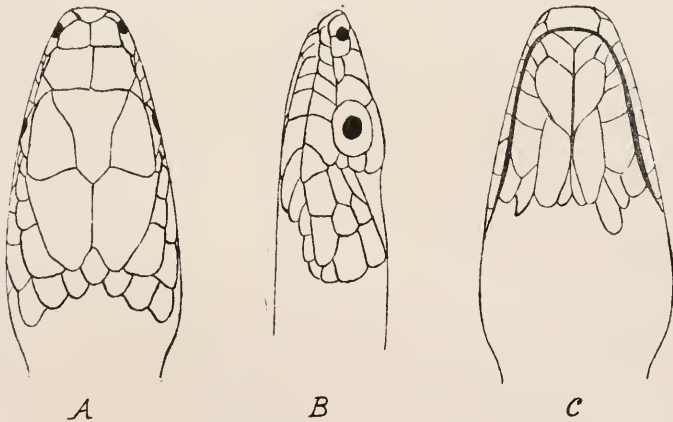


Fig 2

Chrysopelea ornata.

(x 1½)

I am able to support both parties, for I have seen it high in a tree on a naked limb, and on several occasions on bushes, or on the trellis work about tennis courts and verandahs. I never met it on the ground myself, but many of the specimens brought me were reported on the ground. I have not the least doubt that the species is essentially arboreal in habit, but this does not prevent it making frequent excursions to the ground either in search of a fresh feeding area, or in the pursuit of the incautious quarry which its keen vision has detected from its exalted station amid the branches overhead.

It is only natural that it should be more frequently encountered on the ground, because the eyes of the pedestrian are directed below the level of his head, even at his feet. Men other than birds-nesters, fern and orchid hunters, and such like do not gaze much aloft, and the snake reclining along a branch or on the top of a trelliswork even about one's own height, will frequently escape detection though but a few feet or even inches away.

The very fact that Cantor and Stoliezka in unison with other observers mention that geckoes are the principal food seems to me to refute their suggestion that *Chrysopelea* is terrestrial in habit, for geckoes are eminently arboreal. It is to be noted also that all the food partaken of, other than geckoes, is of a nature to be obtained by climbing only. Cantor's inclusion of frogs in their dietary does not vitiate this remark, for though he does not say so, the species taken may have been arboreal forms only.

Chrysopelea is not infrequently found about, and actually inside habitations. Flower mentions this, and Evans and I had similar experiences in Burma. I well remember in Colombo, too, one that had taken up its quarters in an old packing case which was full of straw and other packing material. A cooly was ordered to clear this out, and stepped into the box to carry out his orders. His exit reminded one of an incautious bather who has stepped into over-hot water. The alacrity of movement so foreign to the cooly's nature was explained by the subsequent discovery of a snake of this species.

Disposition.—Very divergent views again have been expressed on this point. Cantor remarks on the gentleness of the species, whilst Flower on the other hand says "*Chrysopelea ornata* is the fiercest snake I have met. Under circumstances when most snakes, harmless

and poisonous alike, would try to glide away quietly, this one will turn to attack the person who disturbs it, and will attempt to resist capture to the uttermost, striking, and biting ferociously. * * * Individuals I have at various times tried to keep in captivity showed no signs of becoming tamer, and would always bite my hand when I put it in the vivarium, and being also an annoyance to the other inmates of the cage, I have only kept them for a few days at a time."

I must say I can abundantly confirm Flower's experiences. There is no doubt that this snake is decidedly plucky, and on occasions fierce, but I would not suggest that all are equally vicious. I think that snakes, like other creatures, exhibit individual character.

I well remember my servant in Rangoon trying to effect the capture of a large specimen in a hedge adjoining my compound. I arrived on the scene when the excitement was at its height and discovered that all the menial establishment amounting to ten or more had been pressed into service. The snake had fought most courageously to elude capture, and struck at any one who ventured to attempt to grasp it. My boy, confident of master's solatium in the form of a rupee if the creature was captured alive, had been struck at and bitten, and I hardly knew which to admire most, the servant's determination and courage or the snake's vigorous endeavours to retain its liberty.

Flower mentions one in a fit of rage biting itself with such vigour that its teeth were fixed into the side of its body, and I can remember recapturing one which had escaped from my vivarium and had taken refuge between some boards in my house. When extricated after some difficulty, and with the employment of some force, it struck at and buried its teeth in its own body.

The fact that this snake will even face, much less try conclusions with a tuftoo (*Gecko verticillatus*) is eloquent proof of its intrepidity. Flower says: "I have known it eat *Hemidactylus frenatus* and *Gecko verticillatus*; the latter may give battle to the snake for some hours before being finally swallowed." In a recent issue of this Journal I gave two instances of the indomitable courage of this giant gecko. In one instance it was clearly the aggressor, and not only confronted but actually drove back a large rat snake (*Zamenis mucosus*), a species whose courage is well established, and actually during the retreat snapped and bit off part of its tail. In the other

instance witnessed and recounted to me by Captain Lloyd, I.M.S., on Sandoway Island when this gecko was in conflict on the ground with a *Chrysopelea ornata*, it would be difficult to say which was the aggressor, but it is probable that the snake engaged the lizard, not expecting to meet a foeman of such prowess.

Food.—*Chrysopelea*, whilst showing a decided partiality towards lizards of the family Geckonidæ, accepts with avidity many other creatures that chance has to offer.

Members of the genus *Hemidaactylus* are most frequently found to have furnished the meal, obviously from the relative abundance of the species in this genus and the numerical strength in individuals of many of the species which frequent trees. Many other lizards, however, fall victims to its voracity. Cantor mentions frogs as well, but I have never known one taken, have known them refused in captivity where lizards were accepted, and Mr. Millard tells me also he found frogs were not acceptable. Among other lizards Cantor found *Ptychozoon homalocephalum* taken once, and Evans one of the flying lizards (*Draco tæniopterus*). I have known *Calotes versicolor* taken, and Flower the giant gecko or tuctoo of Burma (*Gecko verticillatus*). Evans and I reported one in this Journal that had eaten a bat (*Taphozous longimanus*), and Evans has since recorded two instances where bats were devoured. Mr. Millard tells me that in captivity it “feeds freely on bloodsuckers, sparrows, geckoes, and mice, but never eats frogs.” He also says it kills by crushing in its folds.

It is interesting to note that Richards* mentions one of his boys having a pet *Chrysopelea ornata* which he fed with milk out of a saucer. He held the snake near the head and put the saucer to it, when it readily drank the milk, and in comparatively large quantities.

Habits.—The striking beauty of this snake, whether seen reclining or moving in its native haunt, could hardly fail to arouse the keenest admiration in the breast of the most unappreciative and phlegmatic disposition.

I watched with admiration recently the adroit, though stealthy, manner in which one in captivity in the Colombo Museum balanced itself, and moved along my walking stick though this was more slender than the snake itself.

* Landmarks of Snake poison, p. 14.

Dillwyn describes this snake clinging to the trunk of a tree, head downwards, in a very extraordinary manner, and I have seen it under almost exactly similar circumstances. My specimen was stationary, clinging (one could not say reclining) head downwards, about 30 feet from the ground, to a large bare trunk, which rose almost perpendicularly. I marvelled at the tenacity of its grip in such a situation. It had thrown its body into a very wide S across the limb, and it strikes me now very forcibly, after reading Flower's and Shelford's observations, that it may have been "gathering itself" for a leap. The enraptured observer will be even more captivated with the grace and agility attending its movements from branch to branch, and the consummate ease with which it will scale a perpendicular trunk. Its flash-like disappearance aloft without apparent effort must be witnessed to be fully appreciated. I very much doubt whether any snake moving along the flat displays greater speed than this species in its arboreal environment.

But its marvellous attainments do not end here, for this snake is endowed with the capability to spring, or "fly" as some prefer to call this jactatory effort. Here one is forcibly reminded of the eulogistic terms in which the late Professor Owen summed up the athletic performances of these limbless creatures.

He says: "They can outclimb the monkey, outswim the fish, outleap the jerboa, and suddenly loosing the coils of their crouching spiral, they can spring into the air and seize the bird upon the wing."

One has only to be acquainted with *Chrysopelea* to realise that Owen's words convey no fulsome flattery.

That it actually can spring is vouched for by more than one reliable observer. Flower* in 1899 reported having seen "a small one, about 2½ feet long, take a flying leap, from an upstairs window, downward and outward on to a branch of a tree and then crawl away among the foliage. The distance it had jumped was measured, and found to be nearly 8 feet."

Curiously enough in the very month (May) and year (1899) when this record of Flower's was published, Mahon Daly wrote from Siam reporting his having witnessed a similar feat. His letter appeared in Vol. XII, page 589, of this Journal, and though he could not

* Proc. Zool. Soc. Lond., 1899, p. 684.

identify the snake he said that he and his Kareen interpreter saw a snake, "about $2\frac{1}{2}$ feet long, sail from a very high tree on one side of the road to a lower one the opposite side."

In confirmation of these very extraordinary acrobatic feats which I have no doubt many might be inclined to disbelieve is the report made by Shelford of similar performances * This observer relates that three native witnesses in Sarawak made a similar statement on three different occasions independently of one another, and at considerable intervals of time.

This was to the effect in each case that the snake had been seen to "fly" from some height to the ground beneath. In all cases the snake was reported to have kept its body rigid during this feat, and to have met the ground at an oblique angle. In one case the snake proved to be *Chrysopelea ornata*, in the second instance a snake of the same genus, viz., *C. chrysochlora*, and in the third *Dendrophis pictus*.

Shelford calls attention to the fact that all these snakes are alike in the peculiar ridged condition of their belly shields, and he made experiments to ascertain the truth of these reports. He says: "A specimen of *Chrysopelea ornata* was taken to a height of fifteen to twenty feet, and allowed to fall several times; after one or two false starts the snake was felt to glide from the experimenter's hands, straightening itself out, and hollowing in the ventral surface as it moved, and it fell not in a direct line to the ground, but at an angle, the body being kept rigid the whole time * * *. If the snake was thrown up into the air, it seemed unable to straighten itself out; it had to be launched, so to speak, from the hands in order to induce it to assume the rigid position."

He implies therefore that these "flights" are not accidental falls but deliberate voluntary efforts, and suggests that the hollowing of the belly between the two ventral ridges may act mechanically after the manner of a parachute, impeding the action of gravity, and buoying up the creature so as to reduce the momentum with which it would strike the ground. He illustrates this point by comparing the fall of a piece of bamboo bisected longitudinally, and the concave face downwards, with that of a piece of bamboo in its cylindrical form.

* Proc. Zool. Soc. Lond., 1906, p. 227.

In the former case the descent is retarded. I prefer the use of the term "springing" to that of "flying" in describing these feats. Its only rivals in acrobatic and scansorial achievements are the tree snakes of the genera *Dendrophis* and *Dryophis*.*

Breeding.—Our information on this point is scanty. Evans and I obtained one in May with ovarian follicles impregnated, one in June with 9 eggs in the abdomen, and a small specimen, length not noted, believed to be a hatchling in June. These were all obtained in Rangoon. Since these specimens were recorded in this Journal†, Evans acquired a specimen from Hanthawaddy, Lower Burma, in June containing 11 eggs; and a brood of 6 young in June in Rangoon.

It is clearly from the above notes not a very prolific species.

The measurements of the eggs were not recorded.

The young in the brood recorded by Evans‡ measured from $4\frac{1}{2}$ to 6 inches in length.

It is not known whether this snake is oviparous or viviparous. Without being too positive I am inclined to think that the eggs I extracted "ex abdomina" contained embryos in a very early stage of development.

This snake grows 9 or more inches each year, so that the specimens reported by Evans $13\frac{1}{2}$ and 14 inches long in August were the previous year's production.

My smallest prospective mother was 3 feet 7 inches long in June and therefore in her 5th year.

Distribution.—This is very extensive, ranging as it does between the western shores of India on the extreme West, through the Malayan regions (continental and insular), South China to the Philippines in the extreme East.

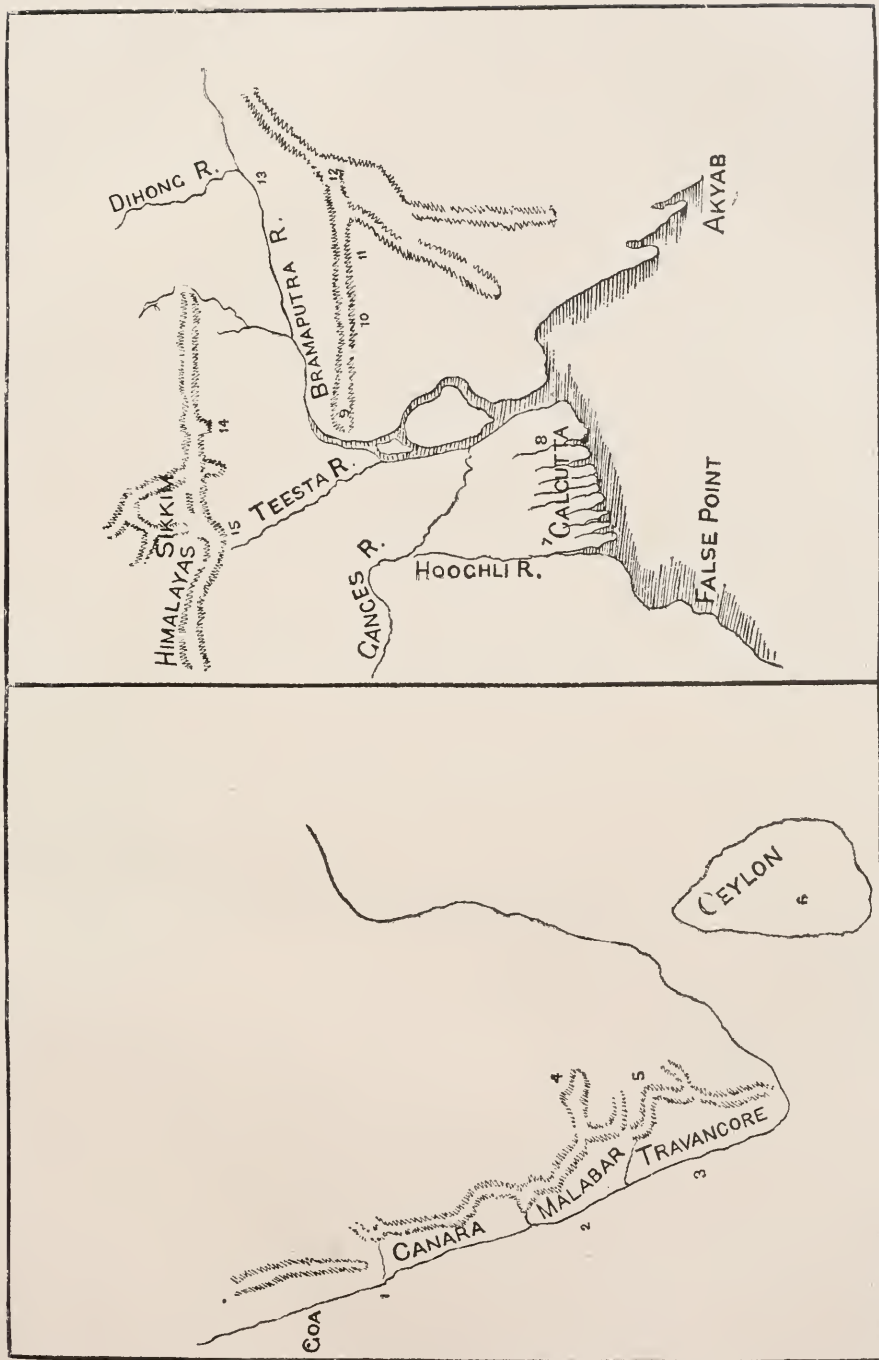
So far as the Indian Peninsula is concerned its distribution is peculiar, and very interesting. It is only found in a small tract of country in the southern part of the Malabar Coast, and in Eastern Bengal. The accompanying maps show the exact localities where it has been met with.

In Ceylon it is not very uncommon, I met with more than one specimen in a four years' residence though not at that time a collector of

* For further remarks on flying snakes see post-script.

† Vol. XIII, p. 614.

‡ Vol. XVI, p. 170.



DISTRIBUTION OF THE GOLDEN TREE-SNAKE (*CHRYSOPELEA ORNATA*) WITHIN INDIAN LIMITS.

snakes. It is referred to by Ferguson, Haly, and Willey from the plains. Mr. E. E. Green tells me he has never heard of it in the hills in that Island, *i. e.* above about 1,500 feet.

It is a fairly abundant species throughout the Malayan Region, and extends throughout Burma. In many parts of Lower Burma it is a common snake (Rangoon, Pegu, etc.). In the extreme south of this Province it has been recorded from Mergui and Tavoy Island (Selater). Captain Lloyd, I.M.S., captured a specimen on Sandoway Island which I have already referred to. To the east of this Province Selater has recorded it from Moulmein, and Evans and I had specimens sent to us by Colonel Bingham from the Southern Shan States. The British Museum has a specimen from the same donor from the Ruby Mines, but it appears to be uncommon in that part, for at Mogok Mr. Hampton tells me he has had no specimen in a 9-years' residence.

From Burma it extends to the North, through Assam, and across the Brahmaputra into the Eastern Himalayas, and in a westerly direction into Eastern Bengal, where its exact limits are somewhat uncertain.

It occurs within the Gangetic Delta (Calcutta and Barisal) and it is probable that its western boundary is defined by the Hoogly and Teesta rivers.

It has not as yet been recorded from the Andamans or Nicobars, but Annandale refers to a specimen taken on Narcondam Island by Major Anderson.*

Explanation of Map.

1. Karwar.—Phipson. Bombay Nat. Hist. Soc. Collection.
2. Malabar.—British Museum and Jerdon. (Journ., Asiat. Soc., Bengal, Vol. XXII, p. 529.)
3. Travancore.—Ferguson. Plains and Hills. (Journ., Bom. Nat. Hist. Soc., Vol. X, p. 74.)
Millard. Courtallan in the Hills. (In epistola.)
Selater. List, Snakes, Ind. Mus., Calcutta, 1891.
4. Nilgiri Hills.—Kinloch. Kotagiri, 5,700 feet, rare; Kulhatty, † 5,400 feet. Bombay Nat. Hist. Soc. Collection.

* Journ., As. Soc. Bengal, Vol. XL, p. 422.

† Mr. Kinloch tells me there are two places called Kulhatty in the Nilgiris—one near Kotagiri, 6,500 feet; another, 5,400 feet.